



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,599	12/31/2003	Kazuaki Ejiri	IGM-02001	8531

7590 04/27/2005

Patent Group  
Choate, Hall & Stewart  
Exchange Place  
53 State Street  
Boston, MA 02109-2804

EXAMINER
----------

LEE, CALVIN

ART UNIT	PAPER NUMBER
----------	--------------

2818

DATE MAILED: 04/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

<b>Office Action Summary</b>	<b>Application No.</b> 10/749,599	<b>Applicant(s)</b> EJIRI, KAZUAKI	
	<b>Examiner</b> Lee, Calvin	<b>Art Unit</b> 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 4/7/05 (Election).  
2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.  
4a) Of the above claim(s) 14-16 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-13 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All    b) ☐ Some \*    c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/26/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## OFFICE ACTION

### *Response to Election*

1. The election of claims 1-13, received on March 21, 2005, is acknowledged. As a result, claims 14-16 are withdrawn from further consideration.

### *Claim Rejections - 35 U.S.C. § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 1, 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Sachan et al*

*Sachan et al* (US 6,617,717) discloses a chemical mechanical polishing method for polishing a low-k material insulating layer formed on a semiconductor wafer, comprising of:  
-preparing an aqueous abrasive slurry composed of a water component, an abrasive component, a first additive, and a second to additive for adding acidity to the aqueous abrasive slurry; wherein the first additive comprises a hydroxide selected from the group consisting of ammonium hydroxide  $\text{NH}_3\text{OH}$  and potassium hydroxide  $\text{KOH}$ , and the second additive comprises an acid from the group comprising at least aqueous oxalic acid ( $\text{C}_2\text{H}_2\text{O}_4$ ) solution [Example 2 in col. 5]; wherein at most 2 % of the hydroxide is contained in the slurry  
-feeding the aqueous abrasive slurry to a rotating polishing pad [col. 4, ln.60];  
-applying and pressing the insulating layer onto the polishing pad within a range between approximately 3psi and approximately 5psi [col. 5, ln.28].

a) *Sachan et al* is silent about “for making the low-k material insulating layer of said semiconductor wafer hydrophilic in nature.” The examiner notes that such functional recitation has not been given patentable weight because it is narrative in form unless it must be expressed as a “means” for performing the specified function, as set forth in 35 USC 112, 6<sup>th</sup> paragraph, and must be supported by recitation in the claim of sufficient structure to warrant the presence of the functional language. *In re Fuller*, 1929 C.D. 172, 388 O.G. 279.

c) In re claims 5 and 8, *Sachan et al* suggests, “all slurries in this example containing 10% colloidal silica abrasive (Klebosol 1498), were at a pH of 10.5” [col. 4, ln.65], but not 20% colloidal silica. Moreover, *Sachan et al* does not suggest explicitly that the slurry exhibits a pH falling in a range between approximately 3 to 6.

It would have been obvious to one having skills in the art have modified the weight percent of the colloid silica and/or the pH level of the slurry in *Sachan et al*' process, and thus arrive at the claimed weight percent and the pH level because one would adjust the potassium hydroxide to obtain a desired pH level and/or weight percent of the colloidal silica.

4. Claim 2-3 and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Sachan et al* (US 6,617,717) in view of *Konno et al* (US 2004/0162011).

a) In re claims 2-3, 9, and 13, *Sachan et al* suggests the insulating layer of SiO<sub>2</sub> (beside disclosing, "copper interconnects coupled with low-k dielectrics") *Konno et al* discloses, "silicon oxide dielectrics of low dielectric constant ... an MSQ methyl silsesquioxane film ..." [¶ 0133]

It would have been obvious to one with ordinary skill in the art to modify the low-k insulating layer of *Sachan et al* by utilizing claimed low-k materials, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 SUPQ 416.

b) In re claims 10-12, *Sachan et al* is silent about washing and/or rinsing step. *Konno et al* discloses, "after completion of the polishing treatment, ... the removal of the abrasive grains can be conducted by an ordinary cleaning method ... water" [¶ 0122].

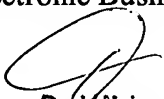
It would have been obvious to one with ordinary skill in the art to modify the process of *Sachan et al* by utilizing an extra washing/rinsing step for the purpose of completely removing unwanted debris/species absorbed on the polished surface [¶ 0123].

#### ***Contact Information***

5. Any inquiry concerning this communication from the Examiner should be directed to *Calvin Lee* at (571) 272-1896 on Mondays thru Thursdays 6:30-4:30PM. If attempts to reach the examiner by telephone are unsuccessful, Art Unit 2818's Supervisory Patent Examiner *David Nelms* can be reached at (571) 272-1787. The fax phone number for the organization (where this application is assigned to) is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system at <http://pair-direct.uspto.gov>. Should you have questions on access to the PAIR system, contact the Electronic Business Center at (866) 217-9197.

CL

  
David Nelms  
Supervisory Patent Examiner  
Technology Center 2800

Dated: April 26, 2005